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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/989,322	11/20/2001	Girish P. Subramaniam	M-12160 US	9964

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EXAMINER	
VO, HUYEN X	

ART UNIT	PAPER NUMBER
2655	

DATE MAILED: 12/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/989,322	SUBRAMANIAM ET AL.	
	Examiner	Art Unit	
	Huyen Vo	2655	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *20 November 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-35* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *20 November 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/8/02*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Allowable Subject Matter

1. Claims 6, 14, 16, 21, and 31 are objected to as being dependent upon the rejected base claims 1, 11, 15, 18, and 26, respectively, but would be allowable if written in independent form including all of the limitations of the base claims and any intervening claims.

2. The following is a statement of reasons for the indication of allowable subject matter: Araki (US Patent No. 6725192) discloses an audio coding and quantization method in that each block of samples of the audio signal is converted into a number of spectral sub-band components. Spectral sub-band components are then subjected to the psychoacoustic model for analysis of allowable distortion level and generation of scalefactors. Scalefactors are used in controlling the operation of the quantizer. Araki fails to specifically discloses the step of calculating a given total scaling value Asfb for a particular frequency scalefactor band according to the equation: Astb = 2{4/(9BWsfb)}^(2/3) * (1/Msfb)^(2/3) * (sum(xi))^(1/3), where BWsfb is the bandwidth of the particular frequency scalefactor band, Msfb is the corresponding distortion threshold, and (sum(xi)) is the sum of all of the transform coefficients for the particular scalefactor band. However, it would have not been obvious to one of ordinary skill in the art at the time of invention to use the above equation to calculate the total scaling value for reach frequency scalefactor band. Therefore, claims 6, 14, 16, 21, and 31 are allowed over prior art of record.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claim 20 recites the limitation "*the first term*" and "*the second term*" in claim 20. There is insufficient antecedent basis for this limitation in the claim. The examiner interprets claim 20 being dependent on claim 19. Appropriate correction is needed.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless – (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 15, 18, and 26-28 are rejected under 35 U.S.C. 102(e) as being anticipated by Araki (US Patent No. 6725192).

7. Regarding claim 26, Araki discloses a computer program product (*the operation of figures 1, 5, and 8 can be written in computer codes stored in a computer readable medium ready to be download to a computer system*) comprising: a computer-readable storage medium, and program instructions stored on said storage medium for

calculating a plurality of total scaling values associated with different frequency scalefactor bands of a signal, using transform coeffcients of the signal and distortion thresholds for each frequency scalefactor band, such that the product of a transform coefficient for a given scalefactor band with its respective total scaling value is less than a corresponding one of the distortion thresholds (*col. 5, ln. 23 to col. 7, ln. 47, since the smaller the scalefactor for each subband is, the lower the level of accuracy of the quatization is. Therefore, the scalefactor for each subband is incremented until the level of distortion is acceptable, and the level of acceptable distortion is still less than the threshold distortion value*).

8. Regarding claims 1, 15, and 27, Araki discloses a method of and a device for determining scalefactors used to encode a signal, comprising the steps of:

associating a plurality of distortion thresholds, respectively, with a plurality of frequency scalefactor bands of the signal (*col. 5, ln. 7-22, allowable distortion threshold is calculated for each sub-band*);

transforming the signal to yield a plurality of sets of transform coefficients, one set for each of the frequency scalefactor bands (*col. 5, ln. 7-22*); and

calculating a plurality of total scaling values, one for each of the frequency scalefactor bands, such that an anticipated distortion based on the product of a transform coefficient for a given scalefactor band with its respective total scaling value is less than a corresponding one of the distortion thresholds (*col. 5, ln. 23 to col. 7, ln. 47, since the smaller the scalefactor for each subband is, the lower the level of accuracy of the quatization is. Therefore, the scalefactor for each subband is incremented until the*

level of distortion is acceptable, and the level of acceptable distortion is still less than the threshold distortion value).

9. Regarding claim 18, Araki discloses an audio encoder comprising:

an input for receiving an audio signal (*input in figure 7*);

a psychoacoustic mask providing a plurality of distortion thresholds, respectively, for a plurality of frequency scalefactor bands of the audio signal (*col. 5, ln. 7-22*);

a frequency transform which operates on the audio signal to yield a plurality of transform coefficients, one for each of the frequency scalefactor bands (*col. 5, ln. 7-22*); and

a quantizer which calculates a plurality of total scaling values, one for each of the frequency scalefactor bands, such that an anticipated distortion based on the product of a transform coefficient for a given scalefactor band with its respective total scaling value is less than a corresponding one of the distortion thresholds (*col. 5, ln. 23 to col. 7, ln. 47, since the smaller the scalefactor for each subband is, the lower the level of accuracy of the quatization is. Therefore, the scalefactor for each subband is incremented until the level of distortion is acceptable, and the level of acceptable distortion is still less than the threshold distortion value*).

10. Regarding claims 2-3 and 28, Araki further discloses a method and computer program product of claims 1 and 26 wherein the signal is a digital signal, and further comprising the step of converting an analog signal to the digital signal (*figure 7 is a*

digital process, ADC is inherently included), and wherein said associating step uses distortion thresholds which are based on psychoacoustic masking (*col. 5, ln. 7-22*).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

12. Claims 4, 19, and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Araki (US Patent No. 6725192) in view of Suzuki et al. (US Patent No. 5654952).

13. Regarding claims 4, 19, and 29, Araki further discloses a method, device and computer program product of claims 1, 18, and 26, wherein said calculating step includes the steps of: for a given frequency scalefactor band, obtaining a first term based on a corresponding distortion threshold (*col. 5, ln. 7-32*). Araki fails to specifically disclose the step of obtaining a second term based on a sum of the transform coefficients. However, Suzuki et al. teach the step of summing transform coefficients (*col. 16, ln. 61 to col. 17, ln. 14*).

Since Araki and Suzuki et al. are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the

time of invention to modify Araki by incorporating the teaching of Suzuki et al. in order to calculate the total energy of each band to determine the amount of perceptual masking.

14. Claims 5, 20, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Araki (US Patent No. 6725192) in view of Suzuki et al. (US Patent No. 5654952), as applied to claims 4, 19, and 29, and further in view of Heddle (US Patent No. 5946652).

15. Regarding claims 5, 20, and 30, the modified Araki fails to specifically disclose a method of claims 4, 19, and 29, wherein the first term is obtained from a first lookup table, and the second term is obtained from a second lookup table. However, Heddle teaches the use of lookup tables in perceptual coding (*col. 15, ln. 11-67*).

Since the modified Araki and Heddle are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to modify further Araki by incorporating the teaching of Heddle in order to reduce processing time.

16. Claims 7-9, 11, 17, 22-23, and 32-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Araki (US Patent No. 6725192) in view of Taniguchi et al. (US Patent No. 6456968).

17. Regarding claims 7, 17, 22, and 32, Araki fails to disclose a method of claims 1, 15, 18, and 26, further comprising the steps of: identifying one of the total scaling values as a minimum nonzero value; and normalizing at least one of the total scaling values using the minimum nonzero value, to yield a respective plurality of scalefactors, one for each scalefactor band. However, Taniguchi et al. teach the steps of identifying one of the total scaling values as a minimum nonzero value (*col. 17, ln. 47-67, the smallest value*); and normalizing at least one of the total scaling values using the minimum nonzero value, to yield a respective plurality of scalefactors, one for each scalefactor band (*col. 17, ln. 47-67*).

Since Araki and Taniguchi et al. are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Araki by incorporating the teaching of Taniguchi et al. in order to realize quality high data rate coding.

18. Regarding claims 8-9, 23-24, and 33-34, Araki further discloses a method of claims 7, further comprising the steps of: setting a global gain factor to the minimum nonzero value (*elements S30-S32 in figure 5, "1" in step S32 can be considered the global gain factor*); and re-quantizing the transform coefficients using the global gain factor and the scalefactors (*elements S30-S32 in figure 5, transformed coefficients are requantized using the incremented sub-band scalefactor*); and the step of computing a number of bits required for said quantizing step (*col. 6, ln. 29-53*); and comparing the

number of required bits to a predetermined number of available bits (*step S44 in figure 8*).

19. Regarding claim 11, Araki discloses a method of encoding an audio signal, comprising the steps of:

identifying a plurality of frequency scalefactor bands of the audio signal (*col. 5, ln. 22-38*);

associating a plurality of distortion thresholds, respectively, with the plurality of frequency scalefactor bands of the audio signal, the distortion levels being based on a psychoacoustic mask (*col. 5, ln. 7-22, allowable distortion threshold is calculated for each sub-band*);

transforming the audio signal to yield a plurality of transform coefficients, one for each of the frequency scalefactor bands (*col. 5, ln. 7-22*);

calculating a plurality of total scaling values, one for each of the frequency scalefactor bands, based on the distortion thresholds and the transform coefficients (*col. 5, ln. 23 to col. 7, ln. 47*);

setting a global gain factor to the minimum nonzero total scaling value (*elements S30-S32 in figure 5, "1" in step S32 can be considered the global gain factor*);

quantizing the transform coefficients using the global gain factor and the scalefactors, to yield an output bit stream (*elements S30-S32 in figure 5, transformed coefficients are requantized using the incremented sub-band scalefactor*);

computing a number of bits required from said quantizing step (*col. 6, ln. 29-53*);

comparing the number of required bits to a predetermined number of available bits; and packing the output bit stream into a frame (*Step S44 in figure 8*).

Araki fails to specifically disclose the step of normalizing at least one of the total scaling values using a minimum nonzero one of the total scaling values, to yield a respective plurality of scalefactors, one for each scalefactor band. However, Taniguchi et al. teach the step of normalizing at least one of the total scaling values using the minimum nonzero one of the total scaling values, to yield a respective plurality of scalefactors, one for each scalefactor band (*col. 17, ln. 47-67*).

Since Araki and Taniguchi et al. are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Araki by incorporating the teaching of Taniguchi et al. in order to realize a high data rate coding.

20. Claims 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Araki (US Patent No. 6725192), in view of Taniguchi et al. (US Patent No. 6456968), as applied to claim 11, further in view of Suzuki et al. (US Patent No. 5654952), and further in view of Heddle (US Patent No. 5946652).

21. Regarding claims 11-12, the modified Araki further discloses a method of claim 11, wherein said calculating step includes the step of obtaining a term based on a corresponding distortion threshold, (*col. 5, ln. 7-32*), but fails to specifically disclose

step of obtaining a term based on a sum of the transform coefficients. However, Suzuki et al. teach the step of summing transform coefficients (*col. 16, ln. 61 to col. 17, ln. 14*).

Since Araki and Suzuki et al. are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to modify Araki by incorporating the teaching of Suzuki et al. in order to calculate the total energy of each band to determine the amount of perceptual masking.

The modified still fails to specifically disclose that the step of obtaining a term is from a lookup table. However, Heddle teaches the use of lookup tables in perceptual coding (*col. 15, ln. 11-67*).

Since the modified Araki and Heddle are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to modify further Araki by incorporating the teaching of Heddle in order to reduce processing time.

22. Claims 10, 25, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Araki (US Patent No. 6725192) in view of Taniguchi et al. (US Patent No. 6456968), as applied to claims 9, 24, and 34, and further in view of Hinderks (US Patent No. 6041295).

23. Regarding claims 10, 25, and 35, the modified Araki fails to specifically disclose a method, apparatus, and computer program product of claims 9, 24, and 34 wherein said comparing step establishes that the number of required bits is greater than the

predetermined number of available bits, and further comprising the steps of: reducing the global gain factor; and quantizing the transform coefficients using the reduced global gain factor and the scalefactors. However, Hinderks teach the steps of reducing the global gain factor (*col. 17, ln. 8-40, scaler 508 makes sure that the amplitude never exceeds the capacity of the quantizer. So if the amplitude is greater than the maximum limit, the scaler scales it down*); and quantizing the transform coefficients using the reduced global gain factor and the scalefactors (*col. 17, ln. 8-40*).

Since the modified Araki and Hinderks are analogous art because they are from the same field of endeavors, it would have been obvious to one of ordinary skill in the art at the time of invention to further modify Araki by incorporating the teaching of Hinderks in order to adjust the samples to fall within operational capacity of the quantizer to achieve quality compression.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huyen Vo whose telephone number is 703-305-8665. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris To can be reached on 703-305-4827. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Examiner Huyen X. Vo

October 15, 2004

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DAVID OMETZ
PRIMARY EXAMINER
ART UNIT 2653